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2. Date of receipt *26-10-37*
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MADRAS RECORD OFFICE.

Government of Madras.

Public Works DEPARTMENT.

G.O. No.	<i>210</i>	Press
<i>Letter</i>		Mis.
Dated	<i>26-10-37</i>	Is

Not to be folded or roughly handled

No. 50. Read the following letter from Colonel C. E. FABER, Chief Engineer; to W. H. BAYLEY, Esq., Acting Secretary to Government, dated 31st May 1858, No. 679.

SIR,

Although in possession of no novel information, nor indeed, any, in addition to that laid before Government in my letters of the 30th January and 11th February last, Nos. 7060 and 7329, yet in compliance with the orders contained in para. 2 of Extract Minutes Consultation of the 15th March 1858, No. 467, directing me to furnish, for the information of the Government of India, a history of the breach that lately occurred in the Godavery Annicut, shewing the causes which led to it, and detailing the means taken for its repair, the cost incurred, and the measures that may still be required for strengthening and securing the work, with their probable cost, I have the honor to forward a Memorandum on the subject from the District Engineer.

2. From that document, and from the previous correspondence with him, which has been submitted to Government, I learn, that on the morning of the 14th November last, without any appearance of weakness in the structure any where having been previously discovered, a breach suddenly occurred in the 3rd or Muddoor Section of the dam near its eastern wing-walls, a single Lascar having alone witnessed the catastrophe.

3. His description of the occurrence throws no light on its causes, but from what has since been seen of the actual state of the river's bed close behind the work, near each of the wing-walls, and from observations of the effect of these on the current near them, there remains no doubt on my mind, that the accident is to be attributed to the strong oblique set, of the stream off the wing-walls, and the sloping extremities of the dam adjoining them, acting on the bed of the river below, so powerfully as to remove the sand to a great depth near all the wing-walls, and in consequence of the existence of a stratum of treacherous quick mud at the point of disruption, to cause the work to sink and give way there.

4. This view of the causes of the disaster is somewhat opposed to that of the District Engineer and Colonel A. T. Cotton, but the former Officer, in reporting the accident, stated that the only reason he could assign for it was, that "during the freshes, a violent current sets off the eastern wing-walls and scours a deep hole below the work," and I do not think, that any thing has since been brought forward to disprove that this set is the real, if not the sole cause, of the scooping out of the river bed near all the wing-walls which produce it.

5. I am informed by the present Officiating Superintending Engineer of the Northern Circle, whose minute acquaintance with the details of the construction of the Godavery Annicut enables him to speak with some certainty, that this set is peculiarly strong at the point in question, in consequence of the direction of the stream approaching the Muddoor Section of the river being directly towards its eastern wing-walls, against which it strikes with augmented velocity and is thrown off with corresponding power. This, combined with the loose nature of the soil on which the Annicut at that particular spot stands, at last effected the destruction of a portion of the work there, notwithstanding the precautions of throwing in additional stone, to strengthen the rough stone apron, which from time to time were taken, as symptoms of weakness appeared. Had a more liberal use of rough stone been made annually, or the apron, at the spot where the dam gave way, been strengthened with that material before the waste boards were put up, the accident would in all probability have been prevented, and I have no doubt, that the true and most effectual means of guarding against a recurrence of one of the same kind, is simply the enlarging the rough stone apron to a width of from 40 to 50 yards at all the points of danger, the general condition of the work being most satisfactory, and promising the utmost stability.

6. The raising of the dam two feet, as proposed by Colonel Cotton and the District Engineer, will certainly not tend to its greater security, though probably expedient as a means of throwing more water into the Delta without enlarging the channels, and of improving the navigation by increasing the depth of water both in the river and in the Canals.

7. On receiving intimation of the accident, the District Engineer hastened to the spot, and lost no time in arresting, as far as possible, the extension of the breach by securing its extremities with rough stone, and in organizing measures for its repair; the first of which was the shutting off the stream by a temporary dam of stone and earth, across that branch of the river. The formation of a water-tight dam in such a position being an operation of the utmost difficulty at so early a period of the season, while a large volume of water continued to flow in the river, the first attempt failed, and it was only after selecting a fresh site, and adopting the use of vast masses of rough stone, that success was attained, and the stream cut off from the branch so as to allow the actual repair of the breach to be commenced.

8. The cost of these preliminary operations, after deducting the value of the stone which will be recovered, has been Rupees 30,365-4-2, inclusive of the cost of the first failure, and the District Engineer states, that the breach, which is being rapidly re-built, will be completely repaired at a further outlay of Rupees 26,290.

9. As however, to the aggregate of these sums must be added the cost of the large additional quantity of stone that should be thrown into the apron near the wing-walls to strengthen those weak points, and stored at convenient spots for use on future emergencies, the total probable expense of repairing the Godavery Annicut this year cannot, I think, be calculated at less than Rupees (90,000) ninety thousand.

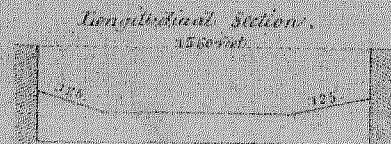
Fort Saint George, Public Works Consultation of 2nd July 1858.

Memo., on the late breach in the Muddoor Annicut prepared for the Chief Engineer, and called for in Extract Minutes Consultation 15th March 1858.

The Muddoor is the 3rd Branch of the Godavery Annicut, and measures 520 yards in length.

2nd. On the 14th November, a portion of this work was injured, by which a breach of 90 yards in length was effected.

3rd. The accident appears to have been owing to the following causes. On either flank the approach from the islands to the work itself, is made by a long slope of 1 in 25 extending to 125 feet in the body of the work, which is therefore higher at the flanks by 5 feet than in the centre.



4th. The consequence is, that a larger body of water is discharged over the centre of the work than at the sides and accordingly begets a corresponding elevation of the river itself

in the centre over that at the sides. By this means, a current is established from the centre to the sides, and eddies created, which by their action caused the sand to be scooped out to a great depth below the work immediately in rear of the sloping approaches.

5th. This process left the Annicut at that particular portion standing as it were on a mound of sand, which by the filtration of water from the upper side must have been forced from under the work into the hole below, and so caused the Annicut itself to subside.

6th. Immediately on the accident becoming known, steps were taken to procure the requisite material for closing that branch of the river by a temporary dam, which proved a very tedious operation. The means successfully employed were large gabions measuring 5 feet in diameter and 6 feet in height, filled with stones brought in boats from the quarry. The quantity of water coming down the river was roughly calculated, and thus a line selected from the dam of such length as should be capable of discharging the quantity not taken off by the under sluices, with the least possible head.

7th. The line having been staked out, the boats were lowered down their sterns being in line, the baskets were then placed on the boat, and when filled with stones, were tilted over. They thus formed an immovable dam. This process was repeated until the river was raised to the requisite height at which the whole could be discharged through the under-sluices. The stone dam was then brought above the level of the water, and a sand and earth bank thrown in front of it to make it water-tight. As soon as this was completed, the repair to the Annicut itself was commenced.

8th. The cost of the temporary dam after deducting the amount of stone recovered, was Rupees 30,365-4-2.

9th. The repairs to the Annicut itself will, when the cut stone work has been completed, be Rupees 26,290.

10th. There are two means by which a recurrence of the accident may be prevented.

The one is, by removing the sloping portions, the other, by throwing a very large quantity of stone in rear of these portions.

The latter will be the preferable remedy, inasmuch, as if the accident is raised, the objection of the sloping portion will in a great measure be obviated.

11th. It will be always advisable to have a store of materials at hand to repair any accident which may happen in future, but I have little doubt that a breach could be repaired in less than 3 weeks, after the experience we have just had in closing the present one. Large quantities of stone are deposited every year on the islands as a precautionary measure, and in future a store of Bamboos will also be kept, but a fleet of Iron boats with a new Steamer will be absolutely necessary, as the Pottinger is entirely worn out. The particulars of the Iron boats and Steamers are treated of separately in another letter.

District Engr. Office, G. D.,
Camp at Dowlaisweram,
28th April 1858.

(Signed) J. H. RUNDALL, Captain,

District Engr. Godavery Division.

No. 51. Ordered in consequence that the following letter be despatched.

From W. H. BAYLEY, Esq., Acting Secretary to the Government of Fort Saint George; to Major R. STRACHEY, Officiating Secretary to the Government of India, D. P. W., dated 26th June 1858, No. 1210.

Sir,

With reference to para. 2 of Mr. Forbes' letter dated 15th March last, No. 468, I am directed by the Right Honorable the Governor in Council to forward for submission to the Government of India, copy of a further report supplied by the Chief Engineer, reporting the accident at the Muddoor Annicut.

1877
Central Office of P. W.
Fort Saint George 31 May 1858

From the Chief Engineer.

To the Secretary to Government
Public Works Department.

Public
Migration

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Memo from

Di Eng of the
Godavari of 28 Apr 58.

Although in possession of no novel information, any, in addition to that laid before Government in my letters of the 30th January and 11th February last Nos 7060 and 7329, yet in compliance with the orders contained in para 2 of Cabinet Minis. Cons. of the 15 March 1858 No 467 directing me to furnish, for the information of the Government of India, a history of the Breach that lately occurred in the Godavery Annicut, showing the causes which led to it, and detailing the means adopted for its repair, the cost incurred, and the measures that may still be required for strengthening and securing the work, with their probable cost, I have the honor to forward a Memorandum on the subject from the District Engineer.

From

2 From that document and ^{from} the
previous Correspondence with him which
has been submitted to Government I learn,
that on the morning of the 14th November
last, without any appearance of weakness
in the structure anywhere having been
previously discovered, a breach suddenly
occurred in the 3rd or Middle door Section of
the dam near its Eastern Wing Walls,
a single Lascar having alone witnessed
the catastrophe.

3 This description of the occurrence
throws no light on its causes, but from
what has since been seen of the actual
state of the River's bed close behind the
Work near each of the Wing Walls, and
from observations of the effect of these
on the Current near them, there remains
no doubt on my mind that the accident
is to be attributed to the strong oblique
set of the Stream off the Wing Walls
and the sloping extremities of the dam
adjoining them acting on the bed of the
River below, so powerfully as to remove
the sand to a great depth near all the
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the accident, states that the only
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I do not think that any thing has
since been brought forward to disprove
that this set is the real, if not the sole
cause, of the scooping out of the river bed
near all the Wing Walls, which produce
it.

5 I am informed by the present
Officiating Superintending Engineer of
the Northern Circle, whose intimate
acquaintance with the details of the
construction of the Godavery Anicut
enables him to speak with some
certainty, that this set is peculiarly
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strong at the point in question, in consequence of the direction of the stream approaching the Muddoor Section of the River being directly towards its Eastern wing walls, against which it strikes with augmented velocity and is thrown off with corresponding power. This, combined with the loose nature of the soil on which the Anicut at that particular spot stands, at last effected the destruction of a portion of the Work there, notwithstanding the precautions of throwing in additional stone to strengthen the rough stone Apron, which from time to time were taken as symptoms of weakness appeared. Had a more liberal use of rough stone been made annually, or the Apron, at the spot where the days gave way, been strengthened with that material before the waste boards were put up, the accident would in all probability have been prevented, and I have no doubt that the true and most effectual means of guarding against a recurrence of

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of one of the same kind, is simply the enlarging the rough stone Apron to a width of from 110 to 50 Yards at all the points of danger, the general condition of the Work being most satisfactory and promising the utmost stability.

6. The raising of the Dam two feet, as proposed by Colonel Cotton and the District Engineer, will certainly not tend to its greater security, though probably expedient as a means of throwing more water into the Delta without enlarging the channels, and of improving the navigation by increasing the depth of water both in the River and in the Canals.

7. On receiving intimation of the Accident the District Engineer hastened to the spot, and lost no time in arresting, as far as possible, the extension of the Breach by securing its extremities with rough stone, and in organizing measures for its repair, the first of which was the shutting off the stream by a temporary Dam of Stone and earth across that branch of the

The River. The formation of a water tight dam in such a position being an operation of the utmost difficulty at so early a period of the season, while a large volume of water continued to flow in, the River, the first attempt failed, and it was only after selecting a fresh site, and adopting the use of vast masses of rough stone, that success was obtained, and the stream cut off from the branch so as to allow the actual repair of the breach to be commenced.

8. The cost of these preliminary operations, after deducting the value of the stone which will be recovered, has been Rupees 30,365-11-2, inclusive of the cost of the first failure, and the District Engineer states that the breach, which is being rapidly rebuilt, will be completely repaired at a further outlay of Rupees 26,290.

9. As however to the aggregate of these sums must be added the cost of the large additional quantity of stone that should be thrown into the Apur near the Wing Walls to strengthen those

those weak points, and stored at convenient spots for use on future emergencies, the total probable expense of repairing the Godavary Ancient this year cannot, I think, be calculated at less than Rupees (70,000) Seventy thousand.

I have the honor to be,
Sir
Your most Obed Servant
Wm. Lister, Colonel
(Chief Engineer)
A.B.

To
The Secretary to Government
Public Works Department.

P.W.D.

No 1210.

To
Major R. Strachey
Offg. Secy to the Government of India
Sir,

With reference to para
2 of Mr Forb's letter dated 15th
March last No 468, I am
directed by the Right Honorable
the Governor in Council to
forward for submission to
the Government of India
copy of a further report supplied
by the Chief Engineer res.
pecting the accident at the
Muddoor Amment.

W H B.

Forst. Geo. George
26th June 1858

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To come up to the Council, 22nd 23rd 24th
of the month of June 1858.
of 12. August 1858. 1721.

20th March 1858
22nd 23rd 24th
of the month of June 1858.

By
The Chief Engineer
The Secretary to the Govt.
P.W.D.

20th March 1858.

Dated 21st

22nd 23rd 24th May 1858.

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of the month of June 1858.

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